

## NEW FOSSIL INSECTS FROM FLORISSANT, COLORADO.

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It was not at first intended to do any work at Florissant during the summer of 1909, but two of my students, Messrs. Rusk and Duce, having become interested in the study of fossils, arranged to go there for a short time. Their collections include the usual percentage of insects, several of which are new and are herewith described.

### HYMENOPTERA.

#### **Eriocampoides revelatus** sp. n. (Tenthredinidæ; Phyllostominae.)

Length about 12 mm.; anterior wing about  $8\frac{1}{2}$ ; thorax black; legs hardly visible, but apparently black; abdomen reddish-brown, very robust,  $4\frac{1}{2}$  mm. broad; wings ample, faintly dusky, anterior wings with stigma and nervures brown.

Venation not essentially different from that of *Eriocampoides* (cf. Macgillivray, Pr. U. S. Nat. Mus., 1906, pl. XXX, figs. 52 and 53); the most striking peculiarity is in the hind wings, in which the vein which should form the truncate apex of the radio-medial cell (marked M in Macgillivray's figures) is wanting, the discal cell being actually joined to (contiguous with) the radial for a very short distance, and the end of the radiomedial cell consequently pointed. In other respects, as the form of the lanceolate, cubital and discal cells, the hind wing agrees with that of *E. æthiops*. The peculiarity referred to may be a variable one, as on one side the medio-cubital vein is broken and a little displaced, but looks as if it had been so attached as to leave an extremely short interval between the discal and radio-medial cells; in this case the description should read, discal cell touching or almost touching the radial, which would afford a very good distinction from the living species. The upper side of the discal cell is about  $629\ \mu$  long.

The following measurements of the anterior wings are in microns:

Cross-nervure of marginal cell, which is long and curved but not bent, about 1105.

First submarginal cell on first discoidal 527.

Second submarginal cell on marginal 1020, on first discoidal 510, on third discoidal 884.

Third submarginal cell on third discoidal 340.

Second transverso-cubital nervure to insertion of marginal cross-nervure 1020; the latter to third transverse-cubital 306, and to apex of marginal cell 1496.

Basal side of first discoidal cell (basal nervure) 1275, its apical side 765.

Lower end of basal nervure to transverso-medial 680, length of the latter 697.

Second discoidal cell on first 782.

Beginning of cross-nervure of lanceolate cell to lower end of transverso-medial 1054.

The insect resembles *E. aethiops* in the distance of the transverso-medial from the basal, the basal without a bend, and the first transverso-cubital so placed that if prolonged it would form a very acute angle with the costa. It resembles *E. varipes* in the long (longer than in *varipes*) and very oblique marginal cross-nervure, joining the third submarginal cell near its end. In the bend of the nervure bounding the lanceolate cell below, it is intermediate between *aethiops* and *varipes*. In the long pointed marginal cell it is nearest to *varipes*, but in the comparatively slight divergence of the two sides of the first discoidal it resembles *aethiops*. It is the first of its genus to be found fossil.

*Habitat*.—Miocene shales of Florissant, Colorado (Willard Rusk, 1909). This has the costal cross-nervure, and is an *Eriocampoides* as defined by Macgillivray.

At Station 13 B, Mr. Duce found a very beautiful specimen of *Megaxyela petrefacta* Brues.

### **Odynerus terryi** sp. nov. (Eumenidæ.)

Length probably about 18 mm., but only the basal part of the abdomen is preserved; head and thorax black, densely punctured; head about 4 mm. long and  $3\frac{3}{4}$  mm. broad. The structural details cannot be made out, except that the ocelli are large ( $255 \mu$  diam.), the scape is slender, and the mandibles are sharply dentate; the antennal sockets are about  $544 \mu$  apart; thorax about 6 mm. long and 5 wide, the large prothoracic lobes as usual in the genus; posterior lobes of the metathorax, on each side of the base of the abdomen, very large and conspicuous, being about  $850 \mu$  long and  $765 \mu$  wide, densely punctured; first abdominal segment broad and short, formed and colored, so far as can be seen, precisely as in *O. diffinis* Sauss. (Bingham, Hymenop. British India, I, f. 106) except that it is shorter, and therefore broader in proportion to its length,—it may, however, be shaped precisely as in *diffinis*, if the clear band, which seems to bound the segment, really traverses its disc, the whole of the structure, which looks like two segments, being really only one. (After repeated examination, I feel convinced that the latter explanation is correct.)

Anterior wings about  $12\frac{1}{2}$  mm. long, folded as usual in the group, dark fuliginous; stigma reddish, nervures piceous. Venation normal for *Odynerus*; marginal cell at end very obliquely truncate, ending in a point away from costa; basal nervure with its upper end remote (about  $850 \mu$ ) from stigma; cubital nervure not bent at end of first discoidal cell; third transverso-cubital nervure arched inwards; both recurrent nervures joining second submarginal cell, the first about  $425 \mu$  from its base, the second about  $289 \mu$  from apex, the distance between them about  $544 \mu$ . The second submarginal is greatly narrowed above its width on marginal being only about  $170 \mu$ . Depth of marginal cell  $986 \mu$ .

Hind wings pallid, with the anal and transverso-medial (or transverse anal) nervures scarcely forming any angle or bend at their junc-

tion; a character very distinctive of the Odynerines; in the Vespines they form a strong angle, and the anal is usually continued to the margin.

*Habitat.*—Miocene shales of Florissant, Colorado, 1909 (*Terry Duce*). A fine species, easily known from the Odyneri previously described from Florissant by its large size.

Messrs. Duce and Rusk obtained a single anterior wing, well preserved, of *Megachile prædicta* Ckll. Can. Ent. 1908, p. 31. This shows that the wing is hyaline, faintly reddish, with the nervures and stigma pale ferruginous.

#### DIPTERA.

### *Syrphus aphidopsidis* n. sp. (Syrphidæ.)

♀ (apparently); length  $14\frac{1}{2}$  mm., but owing to pressure, the pointed apex of the abdomen, usually retracted in cabinet specimens, is extended, giving the insect a rather peculiar appearance, and adding to the length. Width of head about 3 mm., of thorax  $3\frac{1}{4}$ , of abdomen about 4, length of wings 9. Eyes bare, about  $900\ \mu$  apart on vertex, the facets of uniform size, about  $34\ \mu$  diameter; antennæ normal, the apical joint large and rounded, with the usual stout bristle; thorax above coal-black, without light markings; abdomen with very broad light bands on the first three segments, but all interrupted in the middle to the extent of about a third of a mm.; on the first segment the base is dark, but the rest light except a large median inversely cup-shaped area about  $2\frac{1}{2}$  mm. in diameter, its rim resting on the hind margin, its other end connected by a stem with the dark basal area; second segment with a broad basal band, interrupted in the middle, straight behind, except at extreme sides where it is produced posteriorly; third segment with the pale areas widening from the interruption, so that they are triangular in form; fourth segment with a fine continuous pale line at base, widening laterally; wings faintly dusky; hind femora stout, about  $680\ \mu$  diameter, their tibiæ very slender.

Venation compared with that of *Syrphus arcuatus*, *Eupeodes volucris* and *Scæva pyrastris*; measurements in microns:

(1) First vein normal; after reaching the margin it really continues, as in the living forms, to the end of the second, so that the marginal cell, while apparently open, is in reality closed.

(2) Second vein arched, and at its tip deflected upwards; this agrees much better with *Syrphus* than with *Eupeodes* or *Scæva*.

(3) Third vein beyond the anterior cross-vein straight, with a just observable arching; this is quite different from *Scæva*; also different from *S. arcuatus* and *Eupeodes*, in that what arching there is begins at the cross-vein, instead of being confined to the distal part.

(4) Spurious vein very distinct, bisecting the cross-vein a little higher up than in *Scæva*.

(5) Anterior cross-vein not at all oblique (more or less oblique in the living species), placed about 1020 from the base of the discal cell, and of course much before the middle.

(6) Base of discal cell with a diameter of 425; apex rounded and quite remote (a distance as great as the length of the anterior cross-vein) from the lower corner of the first posterior cell. This is unlike the three recent species compared, but the character occurs, even more pronounced, in *Brachyopa notata* and other Syrphidæ. The outer side of the first posterior shows a very strong double curve, and the apex of the cell is quite remote from the margin; all this essentially as in *Baccha dimidiata*.

(7) Cross-vein from anal to discal cells about 595 long, thus considerably longer than base of discal, which is not at all the case in the recent forms compared. This condition exists in *Xylota pigra*, but usually when there is a difference, it is the other way among the American Syrphidæ.

(8) Anal cell normal, closed some distance from margin of wing.

*Habitat.*—Miocene shales at Florissant, Colorado, 1909 (Willard Rusk). The specific name suggests that it may have fed on the genus of Aphididæ, most abundant in the vicinity. The insect seems not to be quite typical *Syrphus*, but it appears to go better there than elsewhere. Easily known from *S. willistoni* Ckll., also fossil at Florissant, by its larger size.

**Dioctria (?) florissantina** (Ckll.) (Asilidæ; Dasypogoninæ).

When describing *Leptis florissantina* (Am. Jn. Sci., Jan. 1909, p. 58), I did not attach enough importance to the length of the second vein. Renewed study shows that the venation is exactly that of the Asilid genus *Dioctria*, except that the cell in the forks of the third vein does not widen apically. The abdomen also agrees with *Dioctria*, but the thorax is much too broad and rounded in front, and the head and eyes, while ordinary for a Leptid, do not look like those of an Asilid. It is possible, however, that they are somewhat distorted.

**Microstylum (?) destructum** sp. nov. (Asilidæ; Dasypogoninæ.)

This insect appears to represent a new genus, but by a great misfortune the pick fell so as to shatter and destroy the whole of the apical half or more of the wings and abdomen, and it is not desirable to attempt a generic diagnosis from what remains.

Body exceedingly robust, head and thorax shining coal-black, the latter about 6 mm. long; structure of head not ascertainable; abdomen reddish-brown with the sutures hyaline, 6½ mm. broad at base; legs slender, dark, hind femur 765  $\mu$  broad near end, without bristles; hind tibia about 544  $\mu$  broad, with very small inconspicuous bristles.

Venation agreeing with *Microstylum flaviventre*, so far as preserved, except as follows:



(1) Stem of second and third veins (from first to divarication) only about 1020  $\mu$  long, and leaving first at a somewhat larger angle; fork much wider, so that at about 2800  $\mu$  from the fork the second and third veins are about 1055  $\mu$  apart.

(2) For the length of 2800 the third vein, very clearly visible, shows no sign of the cross-vein to the fourth, but at this point (where the break occurs) the fourth begins rapidly to ascend, showing that the cross-vein is very little beyond. It results from this that the first basal cell is extremely long, a character of the Mydaidæ.

(3) The fourth vein before the discal cell is not in a straight line with the part bounding the upper side of the cell, there being a very decided bend.

(4) The junction of the discal and second basal is longer, about 1870  $\mu$ . (The cross formed at the lower basal corner of the discal cell, and the adjacent parts toward the anal, are exactly as in *Microstylum*.)

(5) The anal cell is narrowly (170  $\mu$ ) open.

(6) The fifth posterior cell has its upper apical corner cut off by the deflection (to reach the margin at an acute angle) of the terminal section of the fifth vein. This condition is approached in Mydaidæ, and slightly in some Apioceridæ.

(7) The vein which bounds the outer (marginal) side of the closed fourth posterior cell, which in the Asilinæ is directed upwards from the lower corner of the cell, but in *Microstylum* is approximately parallel with the margin, is actually directed, though very obliquely, toward the wing-margin, being broken (through the fracture of the specimen) after a course of 800  $\mu$ , when 170  $\mu$  from the margin, its beginning being about 510  $\mu$  from the margin. I cannot find any genus showing this character, or any nearer approach to it than *Microstylum*.

*Habitat*.—Miocene shales of Florissant, Colorado, 1909 (Willard Rusk). A true *Microstylum* (*M. wheeleri* Ckll.) has been described from the Florissant shales. In addition to the original type, we have now also a specimen found by Mr. Geo. N. Rohwer in 1907 at Station 14.

**Nicocles miocenicus** n. sp. (Asilidæ; Dasypogoninæ.)

Length 13½ mm.; wings 9; length of abdomen 9¼; its breadth 2¾; hind femur about 4 mm.; black, rather robust, the abdomen cylindrical, formed as in *N. æmulatar* Loew; wings faintly dusky, not appreciably spotted; legs robust, including the tarsal joints; hind tibia much longer than its femur; hind basitarsus about 1440  $\mu$  long and 580 broad; thorax and abdomen without visible hairs or bristles; femora not visibly hairy; face with some bristles. In the following account of the venation, comparison is made with Williston's figure of *Nicocles rufus* (N. Am. Dipt., p. 191) and Verrall's of *Dasypogon teutonius* (British Flies, v. p. 708).

Auxiliary and first veins normal, thickened, their terminations about 2720 (this and the following measurements in microns) apart.

Second vein with a gentle upward curve at the end, not so strong as in *Dasypogon*.

Second submarginal cell long and slender; its length about 2620; its breadth in middle 374, and near end about 510; the upper branch of the third vein more bent at the fork than the lower. In *Dasyopogon* this cell is very much wider apically, and in *Nicocles rufus* considerably so.

Anterior cross-vein 1310 from the fork of third vein and 850 from end of discal cell; in being beyond middle of discal cell it differs conspicuously from *Dasyopogon*.

Second and third posterior cells normal; first posterior not widening apically. (It widens in *N. rufus*.)

Fourth and fifth posterior cells normal, widely open.

Anal cell open, about as in *Dasyopogon*. (Closed in *N. rufus*.)

This seems to be a *Nicocles*, a genus well represented in America today. The type of *Nicocles*, according to Verrall, has the anal cell open.

*Habitat*.—Miocene shales of Florissant, Colorado, 1909 (*Terry Ducc*). While on Asilidæ I wish to record the occurrence of *Laphria fernaldi* (*Dasyllis fernaldi* Back) at Teller Lake (near Tolland), Colorado, alt. 9575 feet (*J. Henderson*). A single male was taken July 29, 1909. This fine species, described vaguely from "Colorado," curiously simulates the red-banded *Bombus* common in the same vicinity. This resemblance to *Bombus* has been noticed by P. R. Jones (Trans. Am. Ent. Soc., 1907, p. 282.)

#### EXPLANATION OF PLATE XXVIII.

- Fig. 1. *Eriocampoides revelatus* Ckll., venation.
- Fig. 2. *Microstylum destructum*, venation.
- Fig. 3. *Megaxyele petrefacta* Brues.
- Fig. 4. *Syrphus aphidopsidis* Ckll.
- Fig. 5. *Odynerus terryi* Ckll.